CHROMOSOME COUNTING

- Paul F. White

Some of the characteristics of life are reproduction, metabolism and growth. These are made possible and directed by the nucleus within the cell. The Hibiscus plant is composed of cells, like all other organisms, and most all of these cells have a nucleus. The nucleus functions to 1) store information, 2) impart this information, 3) reproduce this information, and 4) pass it on to another cell or organism.

For the plant to do all this in a cell we can barely see with the naked eye is one of the marvels and mysteries of nature. A particular substance called DNA is involved in all of this highly important work. DNA is short for Deoxy-Ribose Nucleic acid. It is actually a chain of sugar, phosphate and amino acid molecules all connected together in a ladder like chain. The sugar is a ribose. The sequence of amino acid is the "code" on which this information is "imprinted". It is sometimes called the "genetic code". Eventually man will have a complete map of the instruction on each DNA molecule of all animals and plants. Then and only then will we be able to predict the results of Hybrid crosses with any degree of accuracy.

Let us return, however, to reproduction of the cell and the organism. The passing on of information by cell division (division of the nucleus) is called mitosis. It accounts for the increase of cells in the plant. That is the growth of roots, stems, leaves, flowers, fruits, seeds, root iniatition and seedling growth. The DNA molecule reprints exactly and precisely instructions for each cell so it can grow and carry on its complex activities.

When the DNA is in this "working" state it is diffused throughout the nucleus. When the cell is stimulated to divide the DNA coils up tightly to form the chromosomes we are able to see with the microscope. About this time the DNA has reproduced itself, so the

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chromosomes appear doubled. The cell then undergoes some mechanics in which two cells are produced, each of which contains one set of chromosomes. From one "mother" cell we have two daughter cells, each a carbon copy of the mother. The incidence of a mistake in reprinting instructions is about one in ten million.

Reproduction of organisms at the cellular level is very similar to this. Each organism has received one set of chromosomes from each parent. This is called the diploid condition (2N). The chromosomes are transferred by means of the gametes; egg and sperm. In Hibiscus these are two sperms in the pollen grain and many eggs in the ovules which are in the ovary. On pollenation the pollen transfer takes place and at fertilization the two gametes fuse. Obviously some

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